

AMENDMENTS

In the Specification

Please amend the following paragraphs as indicated:

Please substitute the following amended paragraph for the second paragraph on page 5.

Figs. 1, ~~and 2A,~~ and 3A schematically illustrate a first preferred embodiment of the present invention.

Please substitute the following amended paragraph for the third paragraph on page 5.

Figs. 1, ~~and 2B,~~ and 3B schematically illustrate a second preferred embodiment of the present invention.

Please substitute the following amended paragraph for the first paragraph on page 7.

Semiconductor chip 10 generally has a coefficient of thermal expansion (CTE) of about $3.0 \times 10^{-6}/K$. Semiconductor chip/die 10 is preferably comprised of silicon (Si), germanium (Ge) or silicon germanium (SiGe) and is preferably silicon as will be used of purposes of illustration hereafter.

Please substitute the following amended paragraph for the second paragraph on page 7.

Semiconductor chip 10 generally has a coefficient of thermal expansion (CTE) of preferably from about $2.5 \times 10^{-6}/K$ to $3.5 \times 10^{-6}/K$ and more preferably about $2.8 \times 10^{-6}/K$ when comprised of silicon and from about $5.5 \times 10^{-6}/K$ to $6.5 \times 10^{-6}/K$ and more preferably about $6.1 \times 10^{-6}/K$ when comprised of germanium.

Please substitute the following amended paragraph for the second paragraph on page 9.

Molding compound 18 has a coefficient of thermal expansion (CTE) of preferably from about $5 \times 10^{-6}/K$ to $12 \times 10^{-6}/K$ or $15 \times 10^{-6}/K$ and more preferably about $7 \times 10^{-6}/K$.

Please substitute the following amended paragraph for the paragraph spanning pages 9 and 10.

Heat spreader 20 is preferably comprised of copper (Cu), aluminum (Al), chromium (Cr) plated on Cu, Cr plated on Al, nickel (Ni) plated on Cu, Ni plated on Al, stainless steel or the like materials and is more preferably Cu. The coefficient of thermal expansion (CTE) of the heat spreader 26 is preferably from about $10 \times 10^{-6}/K$ to $25 \times 10^{-6}/K$ depending upon the material and is more preferably about $17 \times 10^{-6}/K$ for copper (Cu).

Please substitute the following amended paragraph for the second paragraph on page 10.

Further processing may then proceed. For example, heat spreader 20 may then be mounted onto a PCB substrate or stiffener 200 using an adhesive 202, as shown in 3A.

Please substitute the following amended paragraph for the first paragraph on page 11.

The thermal grease 32 is thermally conductive and serves as a thermally conductive interface between the heat spreader 20 having a CTE of about $17 \times 10^{-6}/K$, for example, and the molding compound 18 having a CTE of about $7 \times 10^{-6}/K$, for example. This greatly reduces the thermal stress otherwise inherent and has been found to reduce cracking and delamination by up to from 50 to 90% (depending upon the types of thermal grease 32 used and the selected thermal

grease's filling process) in the first embodiment heat spreader ball grid array (HSBGA) package 102. HSFCBGA (heat spreader flip chip ball grid array) has better heat-releasing properties than FCBGA but doesn't suffer higher stress which could damage LK dies. At present, PBGA could be used to assemble LK dies but HSBGA could not. However, HSBGA is required due to the cost concern and heat-release.

Please substitute the following amended paragraph for the third paragraph on page 12.

Heat spreader 24 is preferably comprised of copper (Cu), aluminum (Al), chromium (Cr) plated on Cu, Cr plated on Al, nickel (Ni) plated on Cu, Ni, plated on Al, stainless steel or the like materials and is more preferably Cu. The coefficient of thermal expansion (CTE) of the heat spreader 26 is preferably from about $10 \times 10^{-6}/K$ to $25 \times 10^{-6}/K$ depending upon the materials and is more preferably about $17 \times 10^{-6}/K$ for copper (Cu).

Please substitute the following amended paragraph for the fourth paragraph on page 12.

Further processing may then proceed. For example, heat spreader 24 may then be mounted onto a PCB substrate or stiffener 200 using an adhesive 202, as shown in 3B.

Please substitute the following amended paragraph for the second paragraph on page 13.

The thermal grease 36 is thermally conductive and serves as a thermally conductive interface between the heat spreader 24 having a CTE of about $17 \times 10^{-6}/K$, for example, and the molding compound 18 having a CTE of about $7 \times 10^{-6}/K$, for example. This greatly reduces the thermal stress otherwise inherent and has been found to reduce cracking and delamination by up to from 50 to 90% (depending upon the types of thermal grease 36 used and the selected thermal

grease's filling process) in the second embodiment heat spreader ball grid array (HSBGA) package 104.